

Claims

1. A bone cement composition comprising a calcium component and a liquid component in which the liquid component comprises a mixture of pyrophosphate ions and at least one of the following:
5 orthophosphate ions and/or water.
2. A bone cement composition according to claim 1 comprising between 0.8g to 3.0g calcium component to 1ml liquid component.
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3. A bone cement composition according to claim 1 comprising between 1.5g to 2.5g calcium component to 1ml liquid component.
4. A bone cement composition according to claims 1 to 3 where the
15 calcium component is a solid in the 10nm to 100µm primary particle size range.
5. A bone cement composition according to claims 1 to 4 where calcium component is a calcium phosphate.
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6. A bone cement composition according to claims 1 to 4 where the calcium component comprises at least one of the following: β tricalcium phosphate (β -TCP), α -tricalcium phosphate (α -TCP), tetracalcium phosphate (TTCP), dicalcium phosphate anhydrous
25 (DCPA), dicalcium phosphate dihydrate (DCPD), hydroxyapatite (HA) or calcium oxide (CaO).
7. A bone cement composition according to claims 1 to 6 where the source of pyrophosphate ions is pyrophosphoric acid or a sodium
30 pyrophosphate.
8. A bone cement composition according to claims 1 to 7 where the source of orthophosphate ions is orthophosphoric acid.
- 35 9. A bone cement composition according to claims 7 or 8 where the liquid component comprises between 0 and 90% water by weight.

10. A bone cement composition according to claims 7 or 8 where the liquid component comprises at least 10% pyrophosphoric acid or source of pyrophosphate ions by weight.
- 5 11. A bone cement composition according to claims 7 or 8 where the liquid component comprises no more than 85% pyrophosphoric acid or source of pyrophosphate ions by weight.
- 10 12. A bone cement composition according to claims 7 or 8 where the liquid component comprises at least 5% orthophosphoric acid or source of orthophosphate ions by weight.
- 15 13. A bone cement composition according to claims 7 or 8 where the liquid component comprises no more than 85% orthophosphoric acid or source of orthophosphate ions by weight.
- 20 14. A bone cement composition according to claims 7 or 8 comprising water within the range 0 to 90% by weight, pyrophosphoric acid 10 to 80% by weight and orthophosphoric acid 5 to 80% by weight.
- 25 15. A bone cement composition according to claims 7 or 8 comprising water within the range 30 to 80% by weight, pyrophosphoric acid 10 to 80% by weight and orthophosphoric acid 5 to 40% by weight.
- 30 16. A bone cement composition according to claims 7 or 8 comprising water within the range 0 to 90% by weight, pyrophosphoric acid 10 to 80% by weight and orthophosphoric acid 5 to 40% by weight.
- 35 17. A bone cement composition according to claims 7 or 8 comprising water within the range 45 to 80% by weight, pyrophosphoric acid 10 to 50% by weight and orthophosphoric acid 5 to 40% by weight.

18. A bone cement composition according to any of the preceding claims comprising a retardant.
19. A bone cement composition according to claim 18 where the retardant comprises at least one of the following: Chitosan, calcium sulphate hemihydrate, trisodium citrate, sodium acetate, sodium glycolate, sodium lactate, non-toxic orthophosphate salts, phosphate buffered saline.
20. A process for manufacturing a bone cement of a composition according to any of the preceding claims where the components are compacted to a pressure between 0MPa and 100MPa prior to setting.
21. A bone cement composition comprising a calcium component and a liquid component comprising a solution of polyphosphate salt.
22. A bone cement composition according to claim 21 where the calcium component is calcium hydroxide.
23. A bone cement composition according to claims 21 or 22 where the polyphosphate salt is sodium tripolyphosphate.